

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date  
26 May 2005 (26.05.2005)

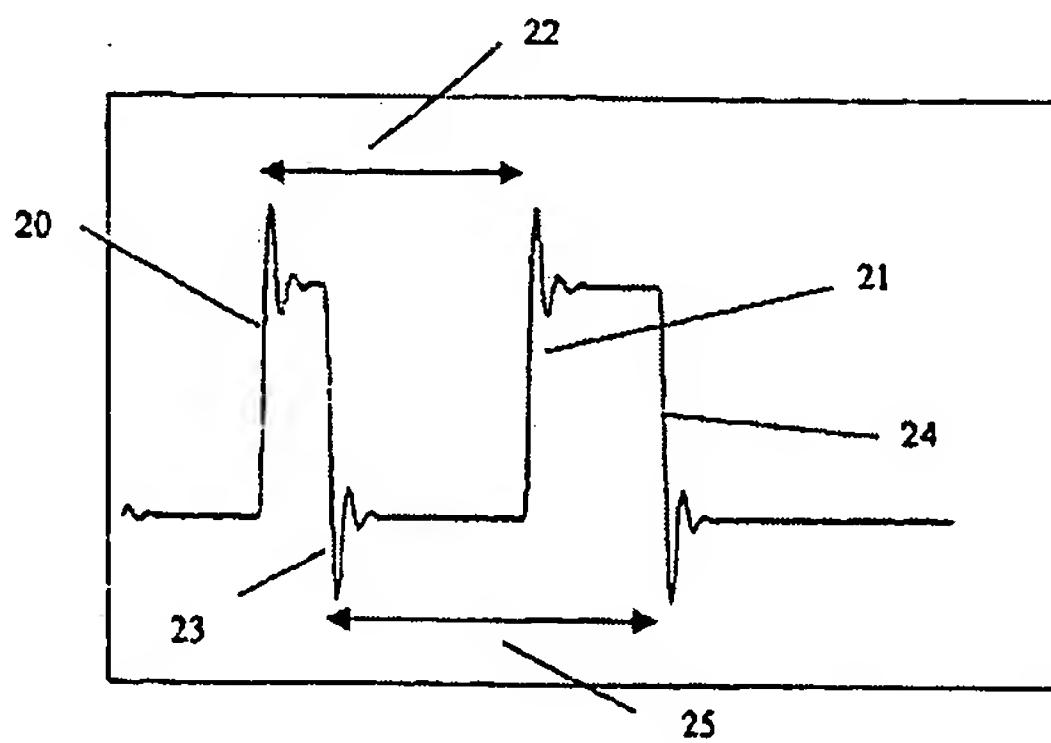
PCT

(10) International Publication Number  
**WO 2005/048459 A3**

- (51) International Patent Classification<sup>7</sup>: H03K 7/06, [GB/GB]; 83 Wroslin Road, Freeland, Witney, Oxfordshire OX8 8HL (GB).
- (21) International Application Number: PCT/GB2004/004712
- (22) International Filing Date: 8 November 2004 (08.11.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0326055.1 7 November 2003 (07.11.2003) GB
- (71) Applicant (for all designated States except US): PLUS DESIGN LIMITED [GB/GB]; Rowan Court, North Leigh Business Park, Woodstock Road, North Leigh, Oxford OX8 6RM (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): ERIC, Atherton
- (74) Agents: DOWNING, Michael, Philip et al.; Fry Heath & Spence LLP, The Gables, Massetts Road, Horley, Surrey RH6 7DQ (GB).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE,

[Continued on next page]

(54) Title: SIGNALLING METHOD AND APPARATUS



(57) Abstract: An electrical signalling system comprises a modulator arranged to accept information and encode that information in an alternating signal containing repeated rising and falling edges, the encoding being by way of the time between consecutive rising or consecutive falling edges, a transmission path for the signal from modulator to a demodulator, where the demodulator is arranged to detect the signal edge and store a record of the signal around that edge and compare a subsequent part of the signal with that record thereby to detect a like edge and detect the time difference between like edges. Such a system need not detect the precise position of the edge but detects that an edge has occurred within a short time frame, and retains an image of the signal during that period. That image is compared with a subsequent part of the signal, and where the subsequent signal differs only minimally from the record the system deems that a second like edge has occurred. Thus, although the precise position, of the edge may or may not be detected by this system, the time delay between respective like edges is detected. The transmission path can be imperfect, for example inductive. The system is capable of sending recognisable signals along a three-phase electrical supply cable. The invention is particularly applicable to the supply of information from downhole sensors in the oil and gas extraction industries. Two signals can be sent simultaneously by also detecting unlike edges and the time difference therebetween. Multiple sources of data can be included consecutively.

**WO 2005/048459 A3**



SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*
- *of inventorship (Rule 4.17(iv)) for US only*

**Published:**

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

**(88) Date of publication of the international search report:**

15 September 2005

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*